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January 10, 1996

To: Don West

From: Ted Snow 

Subject: Final report, grant NAG5-1701

I have been reminded that a final report is long overdue on the subject grant, which supported our research on chemical and physical conditions in dense diffuse interstellar clouds. The grant was issued under the Astrophysics Data Program, and the main purpose was to determine how the depletions of interstellar gas onto dust grains depend on environmental conditions in the interstellar medium.

The primary goal of the study was to analyze data from the *International Ultraviolet Explorer* in order to determine interstellar abundances and depletions (from the gas onto dust grains) in lines of sight intersecting regions of differing physical conditions. We used *IUE* archival data for this study, deriving from them both the UV extinction curves and also the abundances and depletions of gas-phase species. We incorporated the results with those of *IUE* observations obtained by us in 1993 and 1994 (without additional support, as the *IUE* observing program was by then unfunded).

We have one paper now submitted to the *Astrophysical Journal* (preprint enclosed), and another in preparation (the first paper is also being presented as a contributed paper at the American Astronomical Society meeting next week, in San Antonio). Much of the work was done during the period when the grant was in effect, but the final analysis and publication are being accomplished using other sources of support (e.g. the graduate student doing the bulk of the work has his own NASA Graduate Student Research Program grant).

The first paper is an investigation of abundances and depletions in an environment (the Orion nebula) where the dust grains are large and the far-UV extinction is correspondingly low. The depletions appear to be somewhat less than in environments where the far-UV extinction is high because small grains are present. This result, if confirmed by our second study (in preparation) suggests that the regions having small grains have more grain surface area available onto which gas-phase elements can be deposited.